

RESIDENTIAL SPEEDING IN RALEIGH, NORTH CAROLINA

A Final Report to the U.S. Department of Justice, Office of Community Oriented Policing Services on the Field Applications of the Problem-Oriented Guides for Police Project

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SUMMARY

Community concerns about speeding in Raleigh (N.C.), a city of 300,000, have traditionally been a priority of the Raleigh Police Department. Officers issued nearly 25,000 speeding citations in 2001 and more than 40 percent were on roadways posted at 35 m.p.h. or less – residential areas or school zones that experience few collisions but reflect citizen concerns.

Police undertook a problem-solving effort focused on improving speeding in one school zone where more than 3,500 students attended adjacent three schools. In 2001, police had issued nearly 300 citations for speeding on the roadway for speeds averaging 38 mph – 13 mph over the posted speed. Speeding was attributed to high school drivers and commuter traffic. To

learn more about speeding in the location, police examined citations, conducted speed studies and surveyed drivers who were speeding. Analysis showed that the primary speeders were parents of children attending the three schools; youthful drivers and commuters constituted a small portion of the problem.

Raleigh police strategically targeted an educational effort on likely speeders, distributing a flyer about speeding risks to parents in school carpool lanes. Among other responses, police also focused on educating these likely offenders and others about actual speeds through speed display signs. The proportion of drivers complying with the speed limit more than doubled when the educational effort occurred. Although some of this impact deteriorated

within the first week of the project, much of the reduction was maintained. Comparison of data before the project and three weeks later showed a 42% increase in compliance with speed limits in the morning and a 59% increase in the afternoon school zone period. While police in the city had not previously used speed studies to determine the amount of speeding in locations, they plan to use such data in the future to develop priorities and evaluate the impact of their efforts and monitor problem areas over time.

THE PROJECT

In 2001, the Raleigh Police Department (RPD) agreed to test the usefulness of the Problem-Oriented Policing Guide series published by the Office of Community Oriented Policing Services by selecting one of 17 problems and applying the information to a local problem. In early 2002, police in Raleigh undertook an effort to examine and respond to the problem of residential speeding. The problem was initially selected through a survey of sworn personnel in RPD, in which a majority of officers—437, or about 70% of sworn personnel—rated speeding in residential areas as a major problem in patrol areas across the city. Importantly, officers also rated the problem as one that could be substantially improved through the use of problem-solving techniques. Officers in one patrol division, District 2200, rated speeding as the problem of most concern on their beat, and one that could be improved. This geographic area was selected as the focus of the problem-solving effort to be undertaken by patrol personnel.

The scope of the speeding problem in Raleigh was not immediately obvious—there were no existing data to reliably establish the amount of speeding—but speeding has historically been one of the

Department's top priorities. In terms of context, the history of departmental attention to speeding and traffic reflects the city's modest level of serious crime. A city with a population of 300,000, Raleigh has historically enjoyed a low crime rate. In 1999, there were 19,000 Part I crimes in Raleigh—about 6.3:1,000, a rate much lower than the rates in other cities in the State, including Greensboro, Charlotte and nearby Durham. Although the capital city experienced an increase in crime in the mid-1980s, a strong economy and steady population growth have generally eclipsed concerns about crime, and political agendas have traditionally focused more on issues related to planning and growth than on crime. Given that the city has no mass transportation system other than a limited bus system and attracts a large number of commuters who work in State Government, issues related to traffic have often emerged as a consequence of development and reflect a response to transportation issues. To address traffic problems, the Department maintains two full-time traffic squads, dedicated primarily to speed enforcement, and patrol officers throughout the city are encouraged to conduct speed enforcement when they have time. In 2001, the Department's efforts generated nearly 24,000 speeding citations, exceeding the number of reported serious crimes in the city.

The frequency of police contact with citizens as a result of traffic is further illustrated through data collected in the Police Department's annual survey of citizens. In 2001, 40% of respondents reported personal contact with a member of the RPD within the preceding 12 months, and 40% of these had such contact through a traffic stop or as a result of a motor vehicle collision. The data suggest that nearly 50,000 contacts between Raleigh citizens

and police occur each year through traffic stops or collision investigations.

Although speeding is often a concern because of the potential for crashes, much of the Department's effort to control speeding reflects a policy of being attentive to citizens' concerns. Complaints about speeding appear to be of particular concern in residential areas of the city in which roadways support high traffic volume in and near residential areas. The Police Department frequently deploys officers to residential areas for speed enforcement because of citizen complaints.

For the project described in this report, patrol officers in District 2200 initially identified 11 residential street segments as locations with speeding problems (see Table 1). Preliminary analysis of these 11 locations showed that in 2001, 742 speeding citations were issued, 35 complaints from citizens were received, and 45 crashes occurred. The timing of enforcement efforts typically lagged behind the receipt of complaints, while crashes in those locations did not result in enforcement efforts. Of note, analysis of the crashes in the 11 street segments showed that all of these crashes occurred at or near intersections, thus typically reflecting primary collision factors other than speeding.

The 35 complaints to police about speeding in those 11 street segments reflect only those that were routed and recorded through field operations in a log maintained manually. Additional complaints about speeding are made to City Council, the city's Department of Transportation (DOT), through community meetings with police, and other venues. Although there are no reliable data about the frequency of citizen complaints of speeding in residential areas,

it is widely acknowledged that speeding is the most common complaint made to the Police Department. Typically, either patrol officers or traffic unit personnel are deployed to these locations for enforcement.

Police recognize that citizen complaints do not represent the actual distribution of speeding while motor vehicle crashes are a more reliable data source about the distribution of traffic problems. An estimated 13,000 motor vehicle crashes occur in Raleigh each year. However, the large majority of crashes do not occur on residential streets, but at intersections along major thoroughfares that carry most of the city's traffic volume. Crashes typically occur during heavy traffic times and reflect traffic congestion more than speeding, since congestion generally serves to slow traffic down.

An examination of speeding in Raleigh as represented by written citations issued by police suggests that much enforcement occurs in residential areas. Of 17,000 speeding citations issued in 2002, 42% were written in areas posted at 35 m.p.h. or less (the city has a citywide speed limit of 35 m.p.h. "unless otherwise posted"). Although citations do not provide a reliable measure of the prevalence of speeding, they do reflect the Police Department's priorities as interpreted by patrol and traffic personnel in the agency. Citations also provide some insight into the informal tolerances employed by police in speeding enforcement. On average, speeding citations in 2002 were written for speeds 14 m.p.h. over the posted speed limit; in areas posted at 35 m.p.h. per hour or less, speeding citations averaged 13 m.p.h. over the posted speed.

Many speeding citations in Raleigh are issued in areas where the posted speed

limit is 25 m.p.h.—about 9% of all speeding citations in 2002. The issuance of citations at this speed sheds further light on the relationship between enforcement and complaints. At this posted speed, enforcement occurs in school zones and on residential streets. Although the citywide speed limit is 35 m.p.h., City Council permits citizens through petition to have the speed limit on their residential streets lowered to 25 m.p.h.;¹ no empirical study is undertaken to determine if traffic volume, road engineering or other conditions justify this speed limit.

Speeding on many of these residential streets is attributed by police and citizens to “cut through” traffic—the use of streets by commuters and others to avoid heavy traffic on major arteries during rush hours. The Raleigh Department of Transportation (DOT) estimates that about 200 petitions are approved by City Council each year, resulting in inconsistent speed limits across the city. Anecdotal evidence suggests that citizens who have limits lowered this way typically seek police enforcement to lower actual speeds. Studies conducted by DOT indicate that reducing the posted speed does not lower actual speeds, however, and recommends to citizens that lower posted speeds must be accompanied by enforcement in order to reduce speed. Thus, by routinely approving petitions, City Council essentially allocates police enforcement in these areas on the basis of citizen perceptions of problems.

Prior to analysis, patrol officers and supervisors were well aware of problems with speeding; complaints from citizens were acknowledged and often resulted in directed patrols to carry out enforcement. Patrol officers were typically aware of problem locations and were made aware of other locations through “beat books.” Beat

books were used to note citizen complaints about locations, and supervisors typically used these logs to direct the attention of beat officers. In response, officers would traditionally run radar at speeding locations when their call load permitted. Among the 11 initial locations considered by the police for problem-solving efforts in District 2200, most had already been examined and studied by DOT; however, no one in the Police Department appeared to have knowledge of these efforts and the related empirical data. Upon gathering information from DOT, officers were told that speed studies were typically conducted to gather volume information rather than information about speed; although measures of the latter were included in all speed studies, there is no indication that empirical data were routinely or formally provided to the Police Department.

PROBLEM ANALYSIS

For this study, a preliminary form of problem analysis was used to identify potential problem locations, with information gathered through focus group with officers, citizen complaints, motor vehicle crashes, and speeding citations. These preliminary analyses suggested that much police effort—reflected by the volume of speeding citations—was invested in a relatively small number of locations. It also suggested there were substantial differences between problem locations in terms of design and type of roadway.

To further examine differences, and as a technique to prioritize or rank locations for further study, empirical data about traffic volume and speeds were collected through speed studies in each of the locations. These data included volume by time of day, average and 85th percentile speeds and interquartiles, and revealed both the

distribution and range of speeds across 24-hour periods. In becoming familiar with the use of a descriptive statistic—the 85th percentile, which is widely used in the transportation field—police were able to compare dissimilar locations. As a rule of thumb, police learned that this statistic provided guidance about the extent of the problem in differing locations through a practical, standardized and accepted metric for defining a “speeding problem.” In several of the locations initially identified with speeding problems, statistics on 85th percentile indicated to police that they did not justify further analysis and effort.

Of note, several of the speed studies occurred in areas in which speed limits had been lowered through citizen petition. Some of the officers became aware that they had routinely “set up” and issued traffic citations on these roadways with “artificially low” posted speed limits, primarily because of the ease of catching speeders. During project discussions officers became acutely aware of the futility of speed enforcement in these areas where posted limits had been established politically rather than empirically. Informally, these areas were described as those in which residents wanted to deter traffic from outside the neighborhood—known as cut-through traffic—thus creating an enclave composed of what would effectively be private streets rather than public thoroughfares. The apparent thinking of many residents was to push the speed limit so low and enforce it so well that cut through traffic would look for alternative routes. Although police also used the term “cut through” driver early in the project, they became increasingly aware of the rights of all members of the public to use roadways. In short-hand terms, police and transportation officials commented that “not everyone can live on a cul de sac.” Since officers have much discretion about

selecting locations for proactive enforcement including problem-solving efforts, some police articulated a desire to focus their efforts on locations in which there was “legitimate” speeding—i.e., routine speeding in excess of limits that had been established using engineering criteria.

In addition to gathering empirical data and examining the resultant descriptive statistics about speed in the different locations, preliminary analyses of the locations involved officers physically observing traffic there. Although officers were already familiar with these sites, they helped determine precisely where speed data collection tubes would be placed by DOT. In practical terms, analysis at this stage—based upon the data in Table 1—was limited, and led police to categorize the locations into groups reflecting the need for enforcement, education, or engineering solutions, types of responses suggested by the Problem-Oriented Policing Guide.²

REDEFINING THE PROBLEM

Although categorizing speeding locations into three types helped police organize approaches to the 11 locations, their initial analyses were too limited; the project requirement for in-depth analysis helped them further focus and encouraged them to scale down their initial goal of addressing all the problem locations. Although they were reluctant to temporarily shelve any of the locations, there was widespread recognition that one problem location could best be adequately analyzed and a response developed. Through a series of discussions, police chose to focus on Wakefield Pines Drive.

Although speeding in a school zone was not the initial problem undertaken by the Raleigh Police Department, the series of

analytic steps and information collection—scanning—helped them refine and focus their efforts. Once they had focused upon a single area, more in-depth and meaningful analyses were undertaken. These analytic steps followed logically out of redefining the problem from speeding in residential areas to speeding in a school zone in a residential area.

Wakefield Pines Drive is a four-lane divided thoroughfare with a median that provides access to a new and large residential community of single and multi-family homes in the northern predominately residential area of the city. Traffic volume on the thoroughfare averages about 11,000 vehicles per day (see Table 1). Police learned that about one-third to half of the traffic was concentrated during school zone periods, when a student population of approximately 3,500 arrive and depart from three contiguous schools—an elementary, middle and high school. The presence of three schools resulted in a school zone of unusual length, more than three-fourths (0.8) of the mile-long roadway. Police and citizens had been concerned about the location since the three schools opened in 1999 and 2000. While there had been no crashes on the roadway, there had been numerous complaints from parents about speeding during school zone times, parents were concerns about their children's well-being.

The speeding problem on Wakefield Pines Drive initially appeared to be substantial, accounting for 275 speeding citations, almost a third of those issued by police in 2001 at the most problematic locations. Focusing on Wakefield Pines Drive led police to revisit the data contained in the DOT speed study. The 85th percentile recorded in the study for the roadway was 42 m.p.h., a statistic that most officers felt

was reasonably close to the posted 35 m.p.h. speed limit. Further thinking about the statistic, however, revealed that the 85th percentile was based on a 24-hour period, and did not reflect variations that might have been anticipated when the posted speed limit was reduced to 25 m.p.h. The school zone is one-half mile long, nearly three-fourths of the total thoroughfare length of 0.8 miles, with a posted speed of 25 m.p.h. for nearly four hours of each school day. The time frame reflects the staggered start and dismissal times of the three schools, with the lower speed limit in effect from 7 to 8:45 a.m. and 2:00 to 3:30 p.m. on days when school is in session.

The speed data available to police from DOT were further misleading as they were divided into hour-long periods, inconsistent with the changes in the speed limit. The data did not provide a reliable baseline measure about the amount of speeding in school zone time periods, but as they demonstrated that there was a substantial amount of speeding during the hour-long period including the school zone time periods, the police decided to continue analysis. The view that the problem was substantial was supported by a preliminary analysis of citations; of speeding citations issued in the school zone in 2001, the average speed recorded was 38 m.p.h., or 13 m.p.h. over the posted speed; 11% of the citations were for speeds exceeding 45 m.p.h., or 20 m.p.h. over the posted speed.

To address the inadequacies of the speed data, police requested DOT to conduct an additional speed study, using 15-minute time increments. This study, conducted in September 2002, revealed an 85th percentile at 39 m.p.h., lower than the May speed study. However, the speed data were contaminated by a uniformed police effort that had been delayed and was conducted

while the study was underway. (This issue is discussed in detail later in the report.)

Further examination of the problem led police to speculate about the reasons for speeding in the area. Based on their knowledge of the area and complaints from citizens, they established a series of working hypotheses about the problem:

1. Speeders consisted of commuters traveling from suburban locations into the city of Raleigh who might be unaware of times when school zone speed limits were in force.
2. They were regular and routine users of the roadway driving at speeds at which they felt comfortable for the roadway.
3. Speeders were high school students—almost half of all the Wakefield students (46%) are high school students.
4. They were “soccer moms,” or parents in a rush to get to work or to activities after school.

Recognizing that each of these hunches—if supported by data—suggested the need for a very different intervention, the police set out to determine how much speeding existed, when the speeding occurred, and the destination and attributes of speeders. They thought that answers to these four major questions would provide evidence to verify or refute the working hypotheses, and provide direction for developing an effective response.

Since there were no existing data to test these hunches, police decided to collect additional information about the residence and demographic characteristics of speeders, the extent of parents’ concerns about speeding, and more accurate and detailed information about speeding (see Table 2).

Sources included speeding citations; a survey of speeders, in which speeders would be asked a few questions about their behavior; a survey of parents in the three schools; and additional speed studies. In addition to providing information, police thought the parent survey would be useful to enlist support in developing or implementing solutions. Similarly, the speed studies could also be used for assessment purposes, to monitor changes in speeding over time.

Citations

Police recognized very early in this project that citations, an easily available data source, were not a valid measure of the problem of speeding, but there was agreement that analysis of those who had received citations—identified offenders—would constitute a sample of the speeding population. Though we were not able to determine the representativeness of the sample, the data provided useful descriptive information.

The spatial distribution of the residence of speeders—the home address recorded on the citation—was analyzed using the citation data maintained by the Department. The analysis showed that while about 60% of the speeders lived outside Raleigh, a substantial proportion lived within the city (see Figure 1).

Further spatial analysis showed that people living further than two miles away from the location contributed to the bulk of the speeding problem (see Figure 2). The two-mile boundary was adopted informally, based on the spatial distribution or clustering of residences of speeders. This metric was later determined to be somewhat misleading, however. We were initially attempting to determine how many of the speeders lived in

the nearby area in order to differentiate local residents from commuters, but the survey of parents of students in the three schools revealed that 62% of students lived more than two miles away from the school, and more than half of all students usually traveled to school via private passenger motor vehicle. Thus, our initial thinking about commuters did not consider the volume of parents or student drivers traveling to and from the schools who lived outside a one- or two-mile radius of the school area.

Citizen Perceptions

For the purposes of this study, police identified parents of students in the three schools as the “community of interest”, since it was they who had generated complaints to the Police Department and schools about speeding. Police recognized that while parents’ perceptions of speeding may not accurately reflect the amount of speeding in the area, their perceptions and concern for their children’s well-being were an important dimension of the problem.

To document the concerns empirically rather than relying solely upon complaints, police conducted a survey of parents to gauge their perceptions of safety and speeding problems. In September 2002, a 14-item survey was administered indirectly to all parents of students in Wakefield elementary, middle and high schools by being given to students to take home in their backpacks. Although there are more than 3,500 students attending these schools, all students’ parents were surveyed in order to gather general impressions about safety. A total of 1,234 parents responded, an estimated 35% response rate. The estimated return rate is based on the number of students in the schools; however, this census of parents effectively repeats the

count of those with children in more than one school and who answered the survey—or failed to do so—for several of their children. Thus, the 35% return rate is a very conservative estimate, since we are not able to state with precision the number of parents with students in the three schools. We do not know the extent to which the survey results are representative of the population of parents—the survey was conducted to gather descriptive information more than to detect statistical significance on any item.

The survey was administered during the week of September 23, and responses were collected through classrooms over the subsequent two weeks. Data from the survey were entered into a database and analysis consisted of descriptive statistics and cross tabulations of key survey variables.

The survey indicated that more than half of the parents drove their children to school in the morning while about 12% of students walked to school. The pattern changed in the afternoon, when about 35% of parents picked up their children and 20% of students walked home (see Figure 3). Of note, the survey findings were consistent with observed patterns of speeding and traffic volume; though more children walked home from school than walked to school, there was less traffic but more speeding in the afternoon. Since research suggests that traffic congestion slows traffic, it seems reasonable that reduced traffic volume in the afternoon contributes to more speeding.

The survey showed that parents of Wakefield children who walked to school—morning, afternoon or both—were most concerned about safety; only 13% of parents whose children walked to school rated their child as extremely safe (see Table 4), while 27 and 34% of parents of bus or car riders

respectively rated their child as extremely safe going to or from school.

The survey also showed that a majority of parents—72%—believed that drivers did not drive safely in the Wakefield school zone. Similarly, about two-thirds or 62% of parents felt there were not sufficient consequences for unsafe driving and speeding, and many expressed concern about youthful drivers in the area.

Stop and Query Survey

To gain an understanding of who speeds in the school zone and why, police decided to survey them. A brief survey was developed—known informally as the Stop-and-Query Survey—to question speeders in the area during school zone times. In September, approximately 250 vehicles driving 30 m.p.h. or more were stopped by patrol officers or traffic unit personnel. They were given the option to voluntarily complete the survey but were made aware that the officer had the discretion to issue a citation instead. The stops resulted in 186 useable surveys. Data from the survey were entered into SPSS, and analysis showed that:

- About two-thirds of drivers (71%) said they were aware of the speed limit, but were distracted (37%) or in a hurry (25%).
- Only a small proportion of speeders were youthful—about 13% were 19 years old or younger.
- In the morning, most speeders were coming from home (65%) or from school (15%) and were on their way to work. In the afternoon, most speeders (52%) were coming from work or school and most speeders were headed home or places other than work or school.

- A large group of speeders (48%) had children in school, and should have been aware of the speed limit and safety risks during school zone times. In fact, more than half of the parents speeding (55%) had children in Wakefield high, middle or elementary schools³

The survey findings were supported by analysis of citations issued during the school zone times on Wakefield Pines Drive. Of 238 citations issued during school periods, most (87%) were issued to drivers 19 years old or older, demonstrating that high school drivers were not the primary speeders.

Speed Studies

DOT collected baseline data about traffic volume and speed on Wakefield Pines Drive on May 6, 2002. This study showed the volume of traffic at just over 11,000 vehicles per day, an 85th percentile speed of 42 m.p.h., and an average speed of 35 m.p.h. As described in problem analysis, the initial reaction of police was that 42 m.p.h. was a fairly reasonable amount of speeding for a 35 m.p.h. posted roadway; however, after further consideration we realized we were comparing a descriptive statistic from 24 hours of traffic to the speed limit in effect for about 20 hours of the day. Our primary concern was the amount of speeding occurring during the school zone period. Further analysis of the May 6 data was not practicable as they were collected for one-hour time increments and the school zone times were 1¾ hours and 1½ hours respectively for morning and afternoon. To approximate speeding during school zone times, an officer manually entered data about speeding for the period approximating the school zone period, but it was recognized that these data were just rough

estimates that needed verification. Despite the data limitations, police estimated that a large portion of the traffic volume on the roadway occurred during school zone times; thus, the 85th percentile of 42 m.p.h. seemed unreasonable for a 25 m.p.h. roadway and suggested the need for further attention to the problem. Further speed studies were requested for analysis, to enable us to evaluate or assess the impact of responses on speeds. Upon request, DOT changed the time parameters to 15-minute increments for data collected in September 2002.

Qualitative Analysis

While much of the analysis in this project focused on quantitative analyses designed to shed light on the problem, much qualitative information was gathered. Officers read the Problem-Oriented Guides for Police on Speeding in Residential Areas (subsequently referred to as the guidebook) and once the problem was focused on school settings, additional information was collected through an Internet search and literature review to identify unique issues related to speeding in school zones.

Police also worked collaboratively with others during the project, involving personnel from DOT, the Police Department's Traffic Enforcement Unit, School Resource Officers assigned to the schools in the area, and school administrators and representatives for the Wake County Public Schools System who oversee traffic and other safety issues in the school setting, and parents. This involvement of the stakeholders enabled police to develop a broader understanding of the issues related to speeding in school zones and become aware of parent and school administrator concerns about the problem.

A key part of this analysis was making transportation officials aware of police interest in problems, and vice versa. There appeared to have been little formal communication between the RPD and DOT prior to the project, and police were unaware of speed studies, complaints, and other traffic management efforts coordinated by DOT. For example, by reviewing DOT project files for Wakefield Pines Drive, police became aware of its position on a key response—the installation of flashing school zone signs. Although not articulated in policy, DOT correspondence on file indicated that such signals had not been effective in reducing speeds in school zones and were hence not recommended. This view of effectiveness contrasted to research findings in an article reviewed by police.⁴

Another element of the analysis involved police examining the limitations and effectiveness of their current and prior responses to speeding problems. As extensive enforcement in the school zone—and in other locations—had produced little improvement and citizen complaints continued, police were keenly aware of the limitations of enforcement.

PROBLEM RESPONSES

Based on the analyses of speeding on Wakefield Pines Drive, police developed a number of responses to implement. These included:

1. employing a speed trailer (also known as a display board) to electronically flash the speed of drivers. The trailer was intended to increase drivers' awareness of their speed. This response was developed to focus on the one-third of speeders who indicated they were unaware of the speed limit, including commuters

who were unaware of school days, and school-related drivers who might be unaware of their speed.

2. using public service announcements about speeding in school zones and the promise of enforcement, a tactic generally targeting all drivers in the Wakefield school zone
3. educating parents about safety risks related to speeding in school zones and encouraging them to slow down. Information about speeding was distributed to all parents through the PTA newsletter, and flyers were distributed to drivers at the carpool drop-off locations at all three schools. Approximately 500 “mock citation” flyers (see Figure 5) were distributed at the drop-off lanes, specifically targeting the most likely speeders—parents who drove their children to school. Since the survey showed that more than half of speeders were parents of school-aged children, this response was designed to further increase their awareness of the risks associated with speeding, reduce the anonymity associated with speeding, induce some level of shaming and thus slow these drivers down.
4. enforcement efforts to reinforce all three educational efforts
5. a collaborative effort to include school faculty and administrators, students, residents in the area, parents and the PTA, police patrol officers, school resource officers and traffic enforcement unit and the Department of Transportation. This would contribute to community support for responses implemented.

Police also adopted some additional responses that could be implemented in the future:

1. installing flashing signal lights that research has shown to be effective in reducing speeds in school zones, another strategy focusing on drivers who are not parents of school-aged children and who may be unaware of school days and times
2. educating high school students about speeding and holding them accountable. This response would focus on the 13% of speeders identified as youthful

Some responses adopted by the Police Department were longer term in nature:

1. working with the schools to develop a poster campaign to enlist the support of students in encouraging their parents to comply with speed limits
2. pursuing legislative action to increase the penalties for speeding in a school zone, to bring it into line with the penalty imposed for speeding in construction zones. Working with RPD’s attorney and City Council, police sought to increase fines through legislation.
3. examining legislation to result in surrender of drivers’ license for speeding in excess of 15 m.p.h. over the posted speed, regardless of the posted speed. Both the increased penalties were designed to make police efforts at deterrence more meaningful to offenders.
4. routinely monitoring speeding in the areas, and implement new approaches or repeat responses as decay in speed limit compliance

occurred, rather than waiting for the problem to further escalate.

The short-term responses selected by the police were implemented during the course of the project, over the 2002-2003 school year. Table 5 reflects the sequencing and timing of each.

While the police were not responsible for installation of the traffic signal in August 2002, its impact was examined to detect any changes in the problem. The implementation of each of the responses occurred at the direction of the captain in charge of the project and was coordinated by participating officers.

Police did not pursue all the responses suggested in the guidebook to reduce speeding, but rather adopted a set of responses that seemed reasonable and prudent given the scale of the problem and analysis. For example, they did not pursue speed cameras, since red light cameras were contentious and were being debated by the City Council at the time, and there was no early indication that the speeding problem was substantial enough to justify such a financial investment. Neither were engineering responses considered early in the project. Although some emerged during brainstorming, there was concern about their cost. In general, the project team agreed to focus police resources on education and enforcement. Many of the responses described in the guidebook were useful for brainstorming, however.

As indicated in Table 6, most of the responses—enforcement, speed trailer, and a parent education effort—were implemented during the project period, but police were also engaged in some longer-term initiatives, such as seeking increased penalties for speeding in school zones. Some

collaborative educational initiatives, such as “Walk This Way,” will continue beyond the immediate project. By and large, there were few impediments to implementing new responses. Other than a single act of vandalism against the speed trailer, which the guide warned readers about, there were no apparent problems with implementing responses.

PROBLEM ASSESSMENT

To evaluate the impact of the project, data were collected about the volume and speed of vehicles during school zone times (Table 6) at intervals throughout the course of the project. The speed study in May 2002 provided a baseline assessment of the volume and descriptive statistics about traffic volume and speed on Wakefield Pines Drive, but the hour-long time periods of the data limited its utility for analysis. Police requested subsequent speed studies conducted by DOT to use the 15-minute increments.

Overall the speed data suggested that speeds were sensitive to visible enforcement but the timing and quality of data—particularly early in the study—limited the accuracy of the evaluation data. Although there was fairly consistent overall traffic volume on the thoroughfare, the volume of traffic during school zone times varied considerably, ranging from 32% of traffic volume in September 2002 to 55% on April 14. It is unclear what factors contributed to these variations, as efforts were made to collect data on “normal” school days and avoid collection on days that would might distort traffic volume and speed, such as election day, early release, rainy days, or other special conditions.

The first response to address speeding in the school zone was a

pedestrian-activated traffic signal, installed in August 2002. This signal resulted in an apparent reduction by 3 m.p.h. of the 85th percentile speed, and a 4 m.p.h. reduction in average speed (see Table 6); however, the data provided no insight into speeds during school zone times. Our initial approach to measure the impact of the traffic signal was to compare speed statistics, however, data collection at t2 was contaminated when RPD motorcycle officers conducted traffic stops on Wakefield Pines Drive to gather information from speeders. Since these stops were tantamount to enforcement and occurred at the same time of the speed study, we believe that enforcement activity, rather or in addition to the effects of the signal, resulted in lower speeds than would have otherwise been observed. Indeed, the speed statistics at t3 rebounded from t2, with the 85th percentile and average speed climbing 3 m.p.h. The comparison suggested that the signal had no effect and that the observed 3 m.p.h. reduction at t2 was related only to the intense enforcement efforts.

Although data collection at t2 data did not provide a baseline measure of the impact of the traffic signal, it provided a useful baseline measure of the effect of enforcement. An average speed of 25 m.p.h. was recorded during the morning school zone period, and an average of 30 m.p.h. in the afternoon. Traffic unit officers conducted about two-thirds of their stops during the morning period, reducing the average speed to 25 m.p.h. By the afternoon, with less enforcement, the average speed increased to 30 m.p.h. Throughout the study, average speeds were typically higher in the afternoon by one to three miles per hour. The baseline speeds recorded at t2 provided an important comparison to police about the impact of a speed trailer at t3; 85th percentile and average speeds showed no change from

the original speeding patterns at t1 – a discouraging result for police.

Police decided however to focus their responses and speed assessment during the school time period. To establish a baseline, police determined the proportion of drivers during these times who were generally complying with the speed limit by traveling at 30 m.p.h. or less. Using this metric, analysis showed that about 80% of drivers in the morning and 48% in the afternoon were in compliance at t2. By t4, compliance had fallen to 25 and 19% respectively in the morning and afternoon school periods. At t5, police again used the display to inform drivers of their speeds but also distributed informational material at all three schools about observed speeds, dangers, and descriptive characteristics of speeders. As a result of these efforts, compliance increased to 58 and 49%, respectively in the morning and afternoon school periods. Although compliance dropped at t6 and t7, it did not revert to the baseline reflecting the least compliance at t4. During the next month, police continued to implement responses – including a public service announcement and a modest enforcement effort at t8 and t9, respectively. Compliance appeared to reflect the intensity of each response employed but average speeds and compliance were volatile. Education at t5 generated an improvement in compliance followed by decay. A modest enforcement effort at t9 resulted in little change in compliance while the period at t10 demonstrated the lowest average speed and highest compliance since t2. While we have no explanation for the volatility of the measures, project personnel concluded that police efforts may reduce speeding but require periodic maintenance and monitoring to provide reliable evidence about the appropriate dose of any response and the need for follow-up efforts. The

experience of police with volatile speeds also raised further questions among police about the appropriate goals related to reducing speeding. For example, police considered that 32 and 35 m.p.h. average speeds in the project's school zones might be the best that could be achieved in the area without Herculean efforts.

The Problem-Oriented/Action Research Process

After problem selection, the speeding project in early 2002 was assigned to a patrol platoon in District 2200. Over the next 15 months, police worked on the problem from an initial discussion about the selection and purpose of the project, to its conclusion. The project was initiated and carried out during a period of major organizational change. In September 2001, the city's new manager selected a new police chief to lead the agency. The hiring of a female chief from outside the agency, widely touted as a change agent, caused concerns about the direction of the organization and changes in organizational structure, goals and objectives. During the course of this project, the department was reorganized to a geographically decentralized district system, new patrol boundaries were established, major technological retooling was undertaken, a new shift schedule implemented, CompStat was adopted and there were a number of key promotions and retirements. Despite this rapid pace of organizational changes, these issues did not appear to have a deleterious effect on the project but provided a supportive environment for undertaking this type of effort.

Impact of the Problem-Oriented Guide

As it emerged, the speeding problem in Raleigh was quite similar to the general picture of speeding presented in the guidebook on residential speeding. Although the guidebook notes that "many drivers" admit to speeding, data collected in Raleigh indicate that virtually all drivers speed if one uses the posted speed limit to define the offense of speeding. The study of speeding in Raleigh further suggested that traffic speeds are extremely volatile and may rise or fall in response to police strategies or factors beyond police control such as weather and traffic volume.

Most of the police personnel involved in the project read the guide on speeding in residential areas. Many officers appeared to focus on the categories of responses used in the guide—engineering, education and enforcement. A critical element in the guide was the clear evidence about the limitations of enforcement, suggesting the need to determine an appropriate level of enforcement apply enforcement at which drivers would perceive a risk of being caught. The guide also described the high costs associated with maintaining enforcement and the very rapid loss of impact once enforcement is removed. While the guide did not condemn enforcement, suggesting it could be effectively combined with other police strategies such as speed trailers, it clearly advocated the need to be cautious about ubiquitously applying it. This research guidance encouraged police to explore ways to make enforcement more effective; for example, by pulsing modest levels of enforcement on and off rather than trying to maintain a high level of enforcement.

The guidebook provided further insight into the effects of enforcement when carried out on roadways where speed limits were set artificially low, suggesting that enforcement in such locations could undermine public confidence in the police. Many officers took note of this information, and acknowledged that they routinely carried out enforcement in such areas as it was easy to catch speeders. The guidebook caused officers to understand that speed limits are not uniformly established based on engineering standards and thus question the use of discretion in selecting locations for enforcement.

The guidebook provided much initial guidance on analysis and contained a series of useful questions. For example, the guide suggested police should determine where and when speeding occur and suggested the use of computer mapping to answer these questions. The guide also suggested police should determine who are frequent speeders, why people speed, and identify the worst offenders however the guide did not provide suggestions about ways to collect this information or how to make valid comparisons in mapping locations and times of speeding. The guidebook also suggested that police learn about the worst offenders for speeding and determine how fast they drove.

In many ways, the information and advice contained in the guide provided a beacon for analysis in this project. It is not clear that the police would have been willing to sustain their efforts in analysis without the guidebook as a navigational tool reflecting a practical issue in determining what quantity of analysis is sufficient. Initial analyses focused on where speeding occurred and when but police were unable to reliably demonstrate who was speeding and

why. Thus, subsequent analyses focused on collecting information to find reliable answers to these questions.

Some of the project participants were primarily interested in the responses described in the guidebook and their relative effectiveness rather than on the process of gathering information to lead to the selection or development of responses. This focus on responses may have reflected the lack of police experience in using research as police demonstrated great interest in the local information gained through analysis. However, the guide provided a clever mechanism in its appendix, identifying the conditions under which each response worked best. For example, police initially wanted to develop educational campaigns but the guide cautioned the need to specifically determine a target audience. Rather than develop generic educational efforts, police were able to determine the role of parents in speeding and target educational efforts to this particular group.

Participation in the Project and Working Arrangements

This project was carried out as a team effort and included a number of different project participants over the 15-month course of effort. The principal project participants were engaged in the project at different levels at different times, depending upon their role. Early in the project, participants consisted of the Chief of Police, the field operations major, and an administrative captain. They provided feedback on the survey of sworn personnel, and reviewed survey data to make the decisions about what problem should be selected and who would be assigned to work on it. The work was then tasked to line personnel in one patrol platoon, with supervision by a captain assigned to guide the project. Most meetings

were held at the police department, usually just after morning or evening roll call.

Decisions about who would perform specific tasks were usually made at group meetings and responsibility for tasks varied depending on who had the necessary skills and time. There was no formal agreement of how the work would be done, but the distribution seemed to be amicable.

Although the entire platoon was involved in project discussions and some special tasks, one primary officer was assigned to the project and many of the data collection and coordination assignments fell to him. Because the officer had the commitment and skills to handle these tasks, he worked flexible hours to complete them and served as the primary coordinator within the department. The officer had the full support of supervisors, including the Captain, who was able to address issues that emerged during the project—for example, arranging meetings with DOT, gaining approval of the parent survey and arranging for assistance from the traffic unit. Other police personnel made important contributions during the project. For example, one officer with skills in media helped develop conference presentations and public service announcements. The school resource sergeant for the area provided expertise about the history and previous experience in the school zone and arranged meetings with school personnel. The traffic unit carried out most of the stop-and-query survey while other patrol officers participated in enforcement efforts.

The department's Crime Analysis Unit (CAU) was not involved in the project except to provide data on traffic citations. Prior to the appointment of the new Chief, CAU functioned primarily as a records management unit, with few personnel, technological resources and training.

Although the functions of the Unit began to change dramatically during 2002, there was no capacity to provide much assistance during the early phases of our project. There was widespread recognition, however, that the unit was in an organizational transition as the Department moved to a greater reliance on timely, accurate and accessible information.

The Police Chief was not directly involved in the project but played an important albeit indirect role not easily visible to the outsider. The Chief periodically asked questions about project progress, attended several meetings, demonstrated a high level of interest and familiarity with the problem, and recognized individual line personnel who worked on the project. The captain assigned to head the project was well aware of the Chief's interest. Although the Chief was accessible and supportive throughout the project, the captain had both the responsibility and authority independently to carry it out. Thus, while the Chief did not get directly involved in making additional resources available, there was no project need that went unmet during its course.

A professor at nearby N.C. State University, the author of this report served as a locally-based research consultant for police. Most of this assistance involved guiding police through the analytic process – guiding discussions, slowing them from implementing responses without empirical data and ensuring that police responses were justified by data. In addition to informal guidance, the research assistance was also technical and included developing data collection instruments, designing methods for data collection, coordinating data entry, analyzing data and interpreting findings. Analysis was quite modest and consisted of simple frequency distributions and

crosstabulations that did not require complex statistical procedures. From a research perspective, the most critical tasks in consulting were detecting major weaknesses in existing data and designing survey instruments and processes, including sampling strategies, that were both practical for police to carry out and reflected reasonably sound scientific standards. Given the limitations of the CAU, these tasks could not have been accomplished very easily within the Department. Some additional consultants also contributed to the project. Two graduate students mapped citation data to produce maps of the residences of speeders while another student did much of the data entry related to the parent and speeder survey. These data were maintained at the university while most of the DOT traffic studies were captured in Police Department computers.

The working relationship between the principal project participants and consultants was informal and collegial. In general, meetings were held about twice per month during the early part of the project, and supplemented through email and telephone conversations. During the analysis stage, summary memoranda were prepared to keep everyone abreast of what we were learning from our efforts. This sharing of written information seemed valuable for insuring that everyone was on the same page.

Interest and participation in the project waxed and waned over time, particularly losing some momentum when school was dismissed for the summer. Most officers and supervisors in the platoon maintained a high level of interest throughout the project, but the department's 12-hour shift schedule at that time—four day shifts, three night shifts, days, then seven days off—made continuity quite

difficult. Although the key project personnel modified their schedules as necessary, most of the platoon was not routinely available for support and input. The shift schedule also made it difficult to work with a consultant, except when the platoon was on a weekday shift. From the consultant's perspective, the routine of seven days off often caused some delays in scheduling meetings or getting tasks accomplished. All of the project participants – from line personnel to supervisors and consultants – became more engaged in the project as the time approached for conference presentations, submission of this written report and applying for the Herman Goldstein award. Everyone wanted the project to be presented as professionally as possible, and fully represent the efforts that had been undertaken by the Department. There was also recognition that the project was important to the Police Chief, and reflected upon the performance of personnel.

The Research Process

Prior to this study, personnel in RPD had little experience in using consultants, participating in research studies, asking questions about effectiveness of operational practices, or decentralized decision making. To launch this project, all police personnel were provided with a copy of the guidebook. Initial meetings consisted of discussions with police about their perceptions about locations of speeding and characteristics of these locations. The meetings involved asking questions—many suggested by the guide—and helping police translate their ideas into hypotheses that could be validated, nullified or clarified – with empirical data.

Police were aware of the limitations of existing data, recognizing that citation locations reflect the distribution of police

activity and crashes on residential streets rarely reflect speeding. Existing data were used, however, as a preliminary form of analysis to provide support for selection of locations. Despite police concerns about the validity of citations, spatial analyses demonstrated that the data, although limited, could reliably provide insight into speeding: the data were mapped to reveal the proximity of the residences of speeders from arrest locations. Additional data about the distribution of speeding complaints and crashes were used to reinforce officer perceptions and analysis of citations.

Once existing data had been analyzed, police focused on specific locations and articulated hunches about the characteristics of the problem. Officers helped identify the types of information that could be collected to test their hunches about problems and explore other views. For example, officers initially blamed much of the speeding on Wakefield Pines Drive on youthful and commuter drivers however they were quite willing to collect data about the role and contribution of parents to the speeding problem. During the project, police participants appeared to support the collection of additional and were open to alternative responses – primarily in recognition that prior approaches had limited effectiveness. The guidebook had provided an important starting point for asking some difficult questions about current police responses.

Some of the response elements of the project could not be carried out immediately as they were long-term efforts. Although several short-term responses were implemented, police were assessing their level of satisfaction with the continued level of speeding in the school zone, and recognized the need to establish reasonable objectives and to continue to monitor speeds in the area. Importantly, police recognized

the need to work with the schools, parents and DOT in developing and implementing further objectives. For example, one of the project officers became involved with the “Walk this Way” program, which involved parents, school, medical personnel and others in an activist approach to increasing walkability in the community. In addition, one of the primary officers involved in the project was appointed to the city’s Traffic Calming Steering Committee. While it is clear that parents, in particular, and schools will need to maintain an active role in addressing problems relating to speed, empirical data demonstrated the need to focus on parent drivers.

Data Quality and Availability

This progress of this project – and the future of similar problem-solving efforts – was largely influenced by the availability and validity of existing data about speeding and the resultant need to collection additional data.

Three primary types of existing police data— citation data, motor vehicle crashes and citizen complaints—were used for this study. Citation data, which were accessible in electronic form from the Department’s Crime Analysis Unit, were generally considered to demonstrate the presence of speeding in specific locations, as records were created only when speeding was observed and citations were issued but the data were not considered to be representative of the amount of speeding in different locations. There was not evidence that citation data had been validated and included errors. For example, variables on posted speeds often varied from actual speed limits; recorded speed was occasionally less than the posted speed; and the dates of citations were recorded as days or times when speed limits, such as school zone

limits, were not in effect. These data were cleaned, and in cases where errors could not be corrected the records were eliminated from the dataset.

During this project, collision data for the city were not available in an electronic form, although DOT was developing an electronic database of collisions, and compiled collision data for streets of interest for the project. Since the data are reported to the State of North Carolina, they appear to be highly reliable and representative of crashes, however, it appears that few crashes occur on residential streets and many of these do not reflect speed as a primary collision factor.

For this study, data on citizen complaints about speeding were gleaned from a manual review of paper reports maintained chronologically in large binders in the Police Department's Field Operations Division. While these data were accurate, they were not representative of citizen concerns and reflected only complaints called in to the Police Department.

Beginning in 2002, additional but limited data about traffic stops in Raleigh—including the initial reason and outcome of the stop—were collected by police officers to comply with a State mandate for racial information on traffic stops. These data were very limited in scope, consisting primarily of demographic information about the driver and the outcome of the stop and excluding information about the location. Neither the Department nor the project team analyzed these data. In the future, studies of speeding in Raleigh could use the data mandated to be collected through 2004 to make some general inferences about the frequency of speeding stops and their outcomes. A summary of data for 2002 suggested that Raleigh police made about 60,000 traffic

stops, more than three times the number of speeding citations issued that year.

Given the limitations of existing data, police undertook additional data collection for purposes of analysis. In concept, collecting primary data is relatively straightforward; in practice, it is fraught with complexities and pitfalls. Primary data collection requires research expertise for crafting valid survey instruments, time and resources for gathering data, data entry and analysis. Judgments must be made about the tradeoff between precision of information gathered and the difficulty or resources invested. The process of data collection in field settings is further complicated by the limited ability of researchers or police to control the conditions under which data is collected. In this study, the RPD Traffic Unit was delayed in administering the survey of speeders because of the death of a motorcycle officer in mid-September. This delay caused the survey to be administered during the week when tubes were placed by DOT to collect baseline speed data. Although police requested data collection from DOT, the police department could not control when the data collection efforts would occur and the visibility of uniformed police thus contaminated the baseline measures.

Another research problem occurred when the Traffic Unit was asked to conduct surveys only during school zone time periods and to stop surveying when approximately 200 surveys had been conducted. The research design failed to specify that an equivalent number of surveys should be conducted in the morning and afternoon periods. Nearly two-thirds of the surveys were administered during the morning school time, providing scant information about speeding in the afternoon. Later in the project, speed studies revealed

that speeding was more common in the afternoon, despite the time periods being 15 minutes shorter in duration.

In this project, the initial reliance of police upon DOT for speed studies further constrained data collection efforts in the project. The police could not control the timing of speed studies and could not monopolize equipment to collect the amount of data that might have been useful. Since speeds are volatile and influenced by factors as diverse as weather and traffic volume, more speed studies would have been useful for analysis. The limited number of speed studies by DOT was not the biggest difficulty associated with speed data – DOT data consisted only of manual reports and pre-set data summaries. The data form meant police must reenter all data for any type of analyses beyond the standard DOT summaries.

Based on their experience in this project, police determined that speed studies produced extremely useful and reliable data. The data are comprehensive, because they capture the entire population of vehicle speeds rather than a sample. In this project, additional speed studies data would have produced more time points, permitting a more rigorous examination of speeding to detect subtle differences traffic volume and speed over time. Limited data points made it difficult to pinpoint the correlation between varied police efforts and changes in speed. Indeed, additional speed data could have shed light on the incidence of speeding in other school zones. Although there are no other school zones consisting of three contiguous schools like the target area, some other schools in the county may have some similarities, enabling us to compare the proportion of speeding on Wakefield Pines Drive with that in other school zones.

In addition to the data collected about speeding, police undertook two other primary data collection efforts—a stop-and-query survey to learn more about the descriptive characteristics of speeders, and a survey of parents designed to examine their concerns about speeding in the area and establish a baseline ranking of perceptions of safety.

Findings from the survey of speeders informed members of the Police Department—who attributed speeding to commuters and high school students—that parents of students constituted a large portion of the speeding problem, and showed that high school students did not contribute to speeding in the area. These findings were quite important in shaping police strategies. While the initial analysis of citations suggested that youthful drivers were not the primary speeders, the survey of speeders validated this finding providing a second and more source of evidence for this unexpected finding.

In contrast, analysis of data from the parent survey generated no surprises, with parents of students who walked to school being most concerned about the safety of their children. The purpose of the survey was to empirically establish the level of parents concern, as well as to identify the level of support for strong deterrence or ideas for other strategies. Like the police, many of the parents attributed speeding to high school students. Had the stop and query survey, supported by citation data, not exonerated students, police may well have encouraged the high school to increase speeding sanctions for high school drivers such as prohibiting their driving to school. So in this case, data prevented police from adopting a strategy that would have targeted the wrong group.

Impact On Police Policies And Practice

The impact of police efforts on speeding was reflected by reductions, however modest, in speed in the targeted area. The study also had an impact on the police, by influencing policies, practices and thinking about speeding in the city. Importantly, the police acquired equipment to conduct their own speed studies rather than having to request assistance from DOT. The new electronic equipment will enable the police to control where and when speed studies are conducted and analyze the data themselves. For the first time, police will be able to measure the amount of speeding in any particular location, enabling them to:

1. validate (or invalidate) citizen complaints, prior to deploying police resources
2. proactively determine and target problem locations
3. determine time periods in which most speeding, or the most excessive speeding, occurs
4. measure the impact of varying doses of enforcement
5. measure the longevity of impact of enforcement and determine the amount and timing of decay
6. determine objective goals related to speed reduction, including practices of enforcement, thus permitting the traffic unit and field operations to set goals related to speed reduction rather than quantity of citations
7. more equitably distribute or assign police resources on the basis of problem severity or other measures rather than complaints.

In addition, the new technology and this project have opened discussion about what constitutes a tolerable amount of

speeding. Although police recognize any speed over the posted speed is legally interpreted as “speeding,” there is widespread view that citations for a few miles over the posted limits would be contested and dismissed by courts. Thus, most police officers have informal tolerances of speeding – tolerances that varied from one officer to another but usually were around 10 m.p.h. over the posted limit. Towards the conclusion of the project, police begin to discuss formalizing these tolerances as organizational goals related to speeding. In this spirit, police debated the usefulness of different metrics of speed for police purposes: the 85th percentile – an engineering standard, the proportion of drivers generally fairly close to posted speeds, the range of observed speeds highlighting drivers who traveled at excessive speeds, and average speeds.

As a result of these discussions, police considered what “enforceable” speeding meant in practical terms, and questioned how much police effort should be exerted to gain compliance with posted speed limits in school zones or other locations. A rhetorical question was asked about whether full compliance with speed limits was a reasonable or obtainable goal. Police recognized there was no easy answer to this question, but considered whether such discussions could be used to shape a departmental policy on speeding, speed enforcement, and other responses to problems with speeding.

Among police, the study also raised questions about the different types of speeders. In the study of Wakefield Pines Drive, many police were most concerned about excessive speeders—those exceeding the speed limit by 15 m.p.h. or more—and acknowledged the impact that egregious speeders, though probably a very small

proportion of all speeders, had on public perceptions and hence citizen complaints about speeding in residential areas. Police were examining ways to target egregious speeders—through methods other than general enforcement—in order to detect and penalize those who might be responsible for causing community concerns.

Police acknowledged that they interpreted most citizen complaints of speeding as general complaints about too many drivers speeding in an area when in fact they might reflect the actions of a handful of repeat and egregious offenders concentrated in particular times. Indeed, police speculated that egregious offenders were likely to be repeat offenders and are people who frequently traveled specific roadways, their egregious speeding reflecting their knowledge and assessment of the roadway, including conditions and risks. In general, police speculated that routine drivers on roadways were the most likely to speed, while drivers who were unfamiliar with roadways were more likely to comply with posted speeds. While data shed light on the most common types of speeders in the school zone, we were not able to identify the “worst” speeders, those few drivers who traveled at speeds more than 15 m.p.h. over the posted limit.

Police also acknowledged that speed norms were established over time as routine drivers engaged in “keeping up with traffic,” or taking cues about acceptable speeds from the behavior of other drivers. Speed norms are different in different locations, and reflect, in addition to driver’s perception of the road environment and estimations of safe speed, the volume of traffic or the notion of safety in numbers.

Traffic problems related to the contiguous locations of three schools made

police more aware of the role of planning in traffic problems, and they are exploring ways they can be involved in planning for new schools. The Police Department’s work on speeding in school zones has implications for other schools in Wake County. There are 122 public schools in the county—17 high, 26 middle and 79 elementary schools—that serve 97, 583 students. While there have been no other school zones identified that cover as much distance as the target area, speeding in school zones has been a common problem in Raleigh, reflected in citizen complaints and traffic citations. The role of parental involvement in speeding is one that has not been routinely addressed by police other than through enforcement practices. Parents who received police brochures about the number of parents speeding expressed disbelief about the extent of the behavior, and it is hoped that the increased awareness will stop some parents speeding.

Currently, fines for speeding in school zones are no higher than fines for speeding in other locations, although speeding in a school zone generates three points on a driver’s license – the same as running a stop sign. Points often result in higher insurance premiums. Police felt that the fine for speeding in a school zone should be increased—probably to \$300—to bring it into line with penalties for speeding in construction zones. The project also called police attention to the risk of license suspension. While drivers can lose their license for speeding in excess of 15 m.p.h. on roadways posted at 55 m.p.h., there is no such provision for exceeding posted speeds on roads posted at lower limits.

Of note, during the course of this study, City Council considered lowering the citywide speed limit from 35 m.p.h. to 25 m.p.h. in order to make posted speeds more

consistent across the city, but after input from police chief and others, the proposal was rejected.

Appendix A: Stop And Query Survey

STOP AND QUERY SURVEY

1. Do you know the speed limit here?

Yes

No

2. Could you tell me why you were driving so fast?

Distracted/unaware of speed

Just keeping up with traffic

Late/in a hurry

Other _____

3. Where are you headed? (Check box and get address)

Home (enter address in #5)

Work _____

School _____

Other _____

4. Where are you coming from? (Check box and get address.)

Home (enter address in #5)

Work _____

School _____

Other _____

5. What is your (driver's) address? (Note city only if not Raleigh)

6. How many times a day do you usually drive through this location?

1 – 2

3 – 5

6 – 10

More than 10

7. Do you have a child in school?

Yes (Where? _____)

No

8. What would help you to drive the speed limit in this school zone?

Seeing a police officer

Possibility of a big fine/points

More visible signage

Warning signal lights of school open

Other (_____)

9. Driver's age: _____

COMPLETE THE FOLLOWING WITHOUT QUESTIONING THE DRIVER:

10. Driver's gender:

Male

Female

11. Number of persons in vehicle: _____

12. Time of violation _____

13. Street number of violation: _____

14. Recorded speed _____

15. Officer code number _____

Note any other comments about this stop:

Appendix B: Traffic Safety Survey

Wakefield Elementary, Middle and High Schools: Traffic Safety Survey

This survey is being conducted by the Raleigh Police Department with the assistance of the Wake County Public Schools System. The survey evaluates parent concerns about the safety of children traveling to and from school. The results will be used to improve traffic in the area. If you have more than one child in these schools, please complete one survey per child.

1. How does your child usually get to school? (Check only one)

- Bus
- Car
- Walks
- Bikes

2. How does your child usually get home from school? (Check only one)

- Bus
- Car
- Walks
- Bike

3. How do you rate your child's safety going to and from school? (Check only one)

- Extremely safe
- Somewhat safe
- Somewhat unsafe
- Extremely unsafe

4. If you feel unsafe, what factors contribute to these feelings? (Check all that apply)

- Inadequate sidewalks

- Too much traffic
- Speeding
- Youthful drivers
- Carpool congestion
- Crossing major streets on way to school
- Negative influence of other children
- Other (please describe) _____

5. When are you most concerned about your child's safety? (Check only one)

- Most concerned in the morning before school
- Most concerned in the afternoon after school
- About equally concerned in the morning and afternoon
- Not concerned at all

6. If your child does not walk or bike to or from school, why not? (Check all that apply.)

- Too far
- Safety related to traffic
- Weather
- Usually in a hurry
- Just usually drive everywhere
- Concerns about the negative influence of other children such as bullying or drugs
- Other (please describe) _____

7. During school zone times at your child's school, do you think most drivers are aware of the speed limit?

- Yes
- No
- Somewhat

8. During school zone times at your child's school, do you think most drivers drive safely?

- Yes

- No
- Somewhat

9. During school zone times at your child's school, do you think there is enough enforcement of safe driving?

- Yes
- No
- Somewhat

10. Do you think there are sufficient consequences for unsafe driving and speeding in your child's school zone?

- No
- Yes
- Somewhat
- Don't know

11. How old is your child? _____

12. How close do you live to your child's school?

- Within one mile
- One to two miles away
- Two to four miles away
- More than four miles away

13. What gender is your child?

- Male Female

14. Do you have any special concerns about your child's safety going to and from school?

Please return this survey to your child's school as soon as possible.
If you have questions about this survey, contact Sgt. A.B. Lull, Raleigh Police Dept. at 890-3335.

Appendix C: Tables and Figures

Table I: Residential Speeding Locations, District 2200

Location	Nominated by officers	2001 citizen complaints	Crashes	2001 citations	Traffic volume	Lanes	Posted speed	85 th percentile
Cub Trail	X	4	1	17	3,481	2	25	33 m.p.h.
Harps Mill	X	4	14	91	7,012	2	30	37 m.p.h.
Hiking Trail	X	3	4	36	2,450	2	25	34 m.p.h.
Mourning Dove	X	1	0	26	2,754	2	30	33 m.p.h.
Quail Hollow	X	0	5	11	2,457	2	35 (25)	41 m.p.h.
Rainwater	X	0	9	6	4,473	2	35	38 m.p.h.
St. Albans/Hardimont	X	3	10	167	1,902	2	35	38 m.p.h.
Thorpshire	X	3	0	18	2,070	2	25	38 m.p.h.
Wakefield Pines	X	4	2	275	11,095	4	35 (25)	42 m.p.h.
Westbrook	X	8	0	92	2,270	2	25	35 m.p.h.
Wildwood Forest	X	5	0	3	2,522	2	35	45 m.p.h.
Totals		35	45	742				

Table 2: Types and Sources of Information about Speeding on Wakefield Pines Drive

Type of information	Source of information
Addresses of speeders, to provide insight on the role of commuters in the speeding problem	Citations
Information about the composition of speeders, such as age, destination and reason for speeding	Survey of speeders Citations (age only)
The extent of parental concerns about speeding and their children's safety in the three schools	Survey of parents
Complete information about traffic volume and speed during school zone periods	Additional speed studies

Figure 1: School Zone Speeding Citations on Wakefield Pines Drive by Offenders' Residence

Figure 2: Distance of Speeders' Residences from the Location of their Violations, Wakefield Pines Area

Table 3: Parent Survey of Wakefield School Students

	Students	Surveys received	Response
Elementary	850	396	47%
Middle	975	332	34%
High	1710	506	30%
Total	3535	1234	35%

Figure 3: Transportation Mode of Wakefield Schools Students

Table 4: Mode of Transportation Departure from School and Rating of Student Safety

	Extremely safe	Somewhat safe	Somewhat or extremely unsafe	Total
Bus	27% (116)	60% (258)	13% (54)	428
Car	34% (178)	47% (247)	19% (97)	522
Walk	13% (30)	42% (100)	46% (109)	239
Total	27% (324)	51% (605)	22 % (260)	1189

Table 5: RPD Responses to Speeding in School Zone, Wakefield Pines Drive

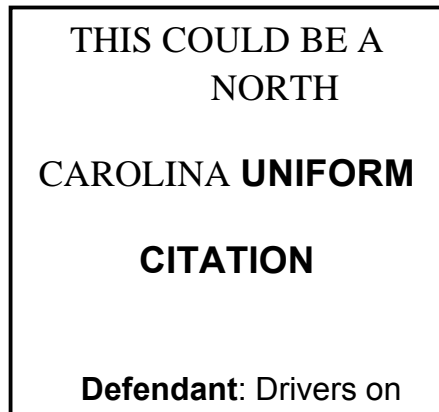
Response	Date	Time period (referenced in Table 6)
Pedestrian-activated signal installed	August 2002	
Traffic enforcement	September 2002	t2
Display board	November 2002	t3
Display board and educational info to parents (see Figure V)	April 2003	t5
Public service announcement about school zone enforcement	May 2003	t8
Enforcement	May 2003	t10
“Walk this way” program	Officer involved Planned for Fall 2003	
City Traffic Calming Committee	Officer involved Summer 2003	
Poster contest	Officer working with SRO Planned for Fall 2003	
School zone fine/license surrender	Police attorney working on legislation	

Table 6: Assessment Measures⁵

T2 25-Sept-02 Signal, Enforcement	T3 7-Nov-02 Speed trailer	T4 14-April-03 No treatment	T5 24-April-03 Education	T6 28-April-03 No treatment	T7 13-May-03 No treatment	T8 14-May-03 PSA	T9 15-May-03 Enforcement	T10 21-May-03 No treatment	T11 22-May-03 No treatment	T12 23-May-03 No treatment
Volume										
10,162	10,447	11,239	11,187	N/A	11,353					
1,858	N/A	3,638	2,787	3,143	3,236	1924	1848	1900	1950	1837
1,474	N/A	2,503	1,768	2,354	2,180	1307	1445	1563	1591	1651
Speed Statistics										
39 mph	42 mph	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
31 mph	34 mph	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
School Zone Speeds										
25 mph	N/A	36 mph	30 mph	32 mph	38 mph	31 mph	31 mph	28 mph	31 mph	31 mph
30 mph	N/A	38 mph	31 mph	35 mph	42 mph	31 mph	33 mph	29 mph	32 mph	33 mph
Compliance										
80%	N/A	25%	58%	42%	39%	48%	46%	72%	48%	47%
(1482)		(892)	(1609)	(1313)	(1270)	(932)	(856)	(1377)	(936)	(862)
20%	N/A	75%	42%	58%	61%	52%	54%	28%	52%	53%
(376)		(2746)	(1178)	(1830)	(1966)	(992)	(992)	(523)	(1014)	(975)
48%	N/A	19%	49%	31%	35%	45%	41%	64%	45%	41%
(703)		(474)	(866)	(731)	(754)	(595)	(595)	(1007)	(714)	(683)
52%	N/A	81%	51%	69%	65%	55%	59%	36%	55%	59%
(771)		(2029)	(902)	(1623)	(1426)	(712)	(850)	(556)	(877)	(968)

Figure 4: Percent Vehicles Traveling 30 mph or Less in School Zone Time Periods⁶

Figure 5: Mock Traffic Citation



¹ Residential streets are differentiated from residential collector streets; to be categorized as the latter, streets must be 35 to 40 feet wide and handle an average of 2,500 cars per day. These streets are designed to provide a connection between major traffic generators—a designed cut through—and designed for travel at 35 m.p.h. Residential streets are narrower and have less traffic.

² Since not all the streets were addressed in analysis, this report does not provide further detailed information about them. However, police recommended using educational responses on Wakefield Pines, Harps Mill and Quail Hollow; engineering responses on Westbrook, Mourning Dove, Rainwater and Wildwood forest; and combined education and engineering responses on Cub Trail, Hiking Trail, St. Albans and Thorpshire Drive.

³ The question about what school the driver's children attended consisted of a fill-in blank on the survey. A manual review of surveys indicated that this blank was not routinely completed, although officers administering the survey checked the "child in school" box. This inconsistency suggests that more Wakefield parents were stopped for speeding than indicated by the numbers recorded.

⁴ Schrader, M. H. (1999). "Study of Effectiveness of Selected School Zone Traffic Control Devices." Transportation Research Record No. 1692: 24-29.

⁵ The column notation of t1, t2, t3 and so forth is used to enumerate the progression of speed measures. The same notation is employed in Figure 4.

⁶ This graph is based on data in Table 5. Data from t1 and t3 are not included because no school zone data were collected at those times.