

# Neighborhood Traffic Management: Process and Results

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## Overview

Neighborhood traffic management, also known as traffic calming or traffic mitigation, has become a major focus in local government and the traffic engineering profession. As the use of the automobile continues to increase, so does the outcry to minimize its impact on residential streets. Cities of all sizes have focused on managing traffic in residential areas for a number of years, but the issue is getting increasing attention and scrutiny. The common goal is to “calm traffic,” with a specific focus on residential areas. Although there is general agreement among transportation professionals about the tools used to calm traffic, there is not always clear agreement on the process for selecting and implementing the tools or on the use and effectiveness of various devices.

This paper focuses on the planning process, approaches to working with local residents, implementation considerations, and the actual effectiveness of various tools.

## The Process

The process used to develop a neighborhood traffic management plan is often more important than the specifics of the plan itself. Traffic management problems are, in large part, citizen perception. In no way does this mean they are any less significant than those that are clearly documented, it only means that the selection of tools and the measures of success need to incorporate their perceptions. No amount of traffic engineering data will convince neighborhood residents that they don't have

a traffic problem in their neighborhood if they believe one exists. Therefore, the planning and public involvement process is a critical, if not the most critical, aspect of neighborhood traffic management.

## Define the problem

Traffic calming is a term used to address a range of problems with an even wider range of solutions. These include the speed and volume of traffic; traffic safety; pedestrian and bicycle safety; cut-through traffic in neighborhoods; traffic noise impacts and other quality of life concerns associated with traffic. Therefore, it is essential to define which specific issues exist in each neighborhood or area of the city before appropriate solutions can be demonstrated or implemented. Because there are so many traffic calming tools in the “toolbox,” each with its own set of advantages, disadvantages and results, the decision to use a specific traffic calming technique should be made based on a clear definition of the problem. Without a clear understanding of the problem, traffic calming devices can create more disruption and more problems than they are intended to solve.

Defining the problem is not a simple issue of data collection and professional judgment. It requires sharing hard data, anecdotal data and perceptions in an open dialogue among city staff, residents of the neighborhood, affected travelers and any others with an interest. Because traffic management addresses various quality of life issues, perceptions of the problem and

of the effectiveness of the solutions are as valuable, and in some cases more valuable, than hard engineering data. The rush to judgment in defining the problem is often the main source of failure of traffic calming efforts.

### **Planning approach**

There are a number of ways to address traffic issues in residential areas. In some cases, it is most appropriate to respond quickly and directly to a specific traffic concern. This applies to site-specific safety concerns that can be addressed with simple signing or operational changes. This is usually not a good approach to address traffic calming concerns such as traffic speed or cut-through traffic, as these concerns generally occur over a larger area and site specific techniques may simply move the problem, cause different problems, or be labeled as ineffective by concerned residents who raised the issues in the first place.

The recommended approach for neighborhood traffic management is a more comprehensive neighborhood planning process. The advantages to this approach include consistency in addressing traffic issues throughout the city; greater involvement of the neighborhood in the planning process; solutions better suited to the unique problems experienced by the residents; ownership of the solutions by the residents who will be most impacted; and reduced impacts to parallel streets or other neighborhoods. The major disadvantage is that a comprehensive neighborhood planning effort requires more resources in terms of staff and resident time, and the overall cost of the process and improvements. The costs, however, are often well worth the investment to find the best set of solutions to implement which

does not result in unanticipated secondary problems.

If neighborhood traffic calming is to be successful, it must address the unique set of concerns within each neighborhood. Neighborhood plans should be developed that provide a comprehensive approach for the neighborhood, focus on the specific problems defined for the neighborhood, and minimize the negative impacts. This requires a systematic public outreach and involvement process on a neighborhood-by-neighborhood basis to develop a shared definition of the problems to be solved and appropriate traffic control measures. The bottom line is, *if it doesn't work for the residents, it won't work for the City*, and all of the effort expended to develop a solution will have been wasted.

### **Develop the range of solutions**

To develop an effective toolbox of traffic management devices there must be a common understanding of the advantages, disadvantages, limitations, and appropriate applications of each device. This requires an education process on the part of all involved and the development of guidelines for the use of each device. Some devices work well under certain circumstances while creating problems, without the desired results, under others. It is important that the appropriate application of each device be defined and guidelines developed. Agencies must review each possible tool to determine its appropriateness for use by the agency before the discussion is brought to the public. A staff workshop to review the appropriateness of specific calming tools is recommended. With staff support in place for the toolbox, the public plan development process will be most effective.

### **Sample tool evaluation**

Given the number and range of traffic management tools, it is important to

consider each tool very carefully before including it in the toolbox. For example, let's consider the applications, advantages, disadvantages, limitations and other impacts of neckdowns, or curb-extensions.

Neckdowns are used to physically and visually narrow the street at an intersection or at mid-block locations. They are the actual realignment and reconstruction of the curb to bring the curblines into the roadway. They can be used on streets that are wide enough to accommodate on-street parking. The realigned curb is generally parallel to the on-street parking lanes. Neckdowns are used where traffic speed and pedestrian safety are a concern. They provide shorter crossing distances for pedestrians at intersections and, if landscaped, they provide a visually narrowing effect and improved aesthetics.

However, neckdowns may create impediments to bicyclists and reduce the turning radius at intersections if not designed carefully. These impacts should be considered for streets serving as a bicycle, truck or emergency route. Some other limitations on the use of neckdowns include the cost of realigning the intersection or street and potential issues with storm drainage. Used by themselves, neckdowns may not achieve the desired traffic calming effect.

Neckdowns are a fairly expensive option that provides aesthetic and pedestrian safety benefits. They are best used as part of neighborhood-wide strategy, in conjunction with other tools such as medians, traffic circles or raised pedestrian crossings. They are generally well received by residents and create minimal user and emergency service impacts if appropriately designed.

### **Policy considerations**

There are several significant policy considerations in developing a comprehensive traffic management plan. These include funding, prioritization and system impacts.

### *Funding and Priorities*

Funding is an important part of the planning and implementation of traffic calming measures. In new developments where traffic calming can be designed into the plan, the cost of traffic calming should be incorporated into the cost of development. However, in previously developed areas that require retrofitting devices, the funding of these improvements becomes a much more complex issue. The cost of the improvements is often higher than a new installation due to necessary changes in street drainage and other roadway reconfigurations.

The question of who pays is one that should be addressed in a public forum. Unless the City has adequate funding to install all traffic calming devices citywide within a short time period, prioritization of neighborhoods is necessary. When funds are limited, one option is to consider incremental improvements, starting with less expensive techniques, testing the results and adding new tools as necessary. These issues need to be addressed on a citywide basis to ensure a level of equity throughout the city.

Residents need to be involved in the funding discussions from the beginning of the traffic calming process. Some cities approach neighborhood traffic calming on a 50/50 cost sharing with local residents. The residents themselves should be involved in the definition of who is responsible for the local cost sharing to ensure that the cost is distributed equitably.

### *Impacts*

As well as their intended positive impacts on neighborhood traffic, calming techniques have potentially negative impacts as well. Some of these include impacts on emergency response, impacts to facility users, ongoing costs, and negative impacts to the neighborhood residents. Resident impacts may include financial costs, noise associated with certain traffic calming devices, access limitations, visual impacts from increased signs, and general nuisance impacts. Impacts to other users include potential increases in emergency response times and inconvenience created by various devices.

Impacts on emergency response is an important consideration. Tests conducted by several fire departments have determined a range of delays to fire trucks induced by traffic circles and speed humps. The results of these studies are shown in Table 1, below. Although the impact of any one device may not be significant, a series or system of devices may add significant delay to emergency response routes.

| Device         | Boulder, CO        | Portland, OR        | Austin, TX         |
|----------------|--------------------|---------------------|--------------------|
| Traffic Circle | 7.5 to 10 seconds  | 1.3 to 10.7 seconds | NA                 |
| Speed Hump     | 2.8 to 4.7 seconds | 0 to 9.4 seconds    | 1.8 to 9.8 seconds |

**Table 1: Emergency Response Delay**

The use of certain devices can also create traffic diversion to parallel routes. Sometimes the shift is desirable, such as when the receiving street is an arterial roadway. But sometimes, if the plan is not developed carefully, the traffic shift may impact another local street or neighborhood. A policy should be developed ahead of time to address how to deal with undesirable traffic shifts.

Policies regarding the allocation of both positive and negative impacts must be a part of the planning process to give clear guidance on the agency's priorities for various concerns. These should include impacts to residents as well as various services within the agency.

### **Demonstration and evaluation**

Demonstration projects with comprehensive evaluation of effectiveness are extremely important in initiating new traffic management plans. Demonstration projects should be undertaken in both new developments and existing neighborhoods requiring retrofit solutions. The evaluation process must include hard data, anecdotal data, and resident and driver perceptions.

Traffic calming effectiveness cannot be boiled down to the change in 85th percentile speed or number of accidents. It is more elusive and qualitative, and measures should include all aspects of the original problem definition for evaluation. Measures of resident satisfaction need to be developed and documented when evaluating the effectiveness of a traffic calming plan.

### **The Results**

Issues of implementation and the effectiveness of different traffic calming techniques are also important considerations in addressing neighborhood traffic concerns. Different tools address different needs. Some are well suited for reducing traffic speeds, while others mitigate cut-through traffic and volume. Some measures have the added benefit of being an attractive, landscaped amenity to the neighborhood.

As various devices are implemented and evaluated, more data are available on implementation concerns and how the devices actually affect traffic in the

neighborhoods. The data below are from recent studies conducted on various traffic management devices implemented on both trial and permanent bases.

### **Effectiveness of traffic calming devices**

Recent studies of permanent and trial installations conducted in a few Colorado communities offer encouragement on the use of various traffic calming devices. The City of Golden found that speed humps used in series resulted in a 13 to 15 mph reduction in the 85<sup>th</sup> percentile speed and at least a 14 mph reduction in the maximum speed observed. Despite these impressive results, the speed humps were unpopular with the local residents. The humps were removed and were replaced with a combination of median islands, curb extensions, and a traffic circle, all of which were attractively landscaped. These landscaped features were not quite as effective in reducing the 85<sup>th</sup> percentile speeds (9 to 12 mph reduction) but were actually more effective in reducing the highest speeds observed. The final result is a much more livable roadway and a neighborhood that is pleased.

The City of Thornton, Colorado recently reported reducing 85<sup>th</sup> percentile speeds by 5 mph through the use of a mobile speed trailer. Based on these encouraging results, the City is considering expanding the program.

The City of Boulder, Colorado has been experimenting with traffic calming measures for quite some time and has employed speed humps, raised pedestrian crossings, flat top speed tables, traffic circles, all-way stops, medians, neighborhood entry islands, diverters, semi-diverters, turn restrictions, realigned intersections, and raised intersections. Boulder's speed humps

typically reduce the average speeds by 2 to 6 mph.

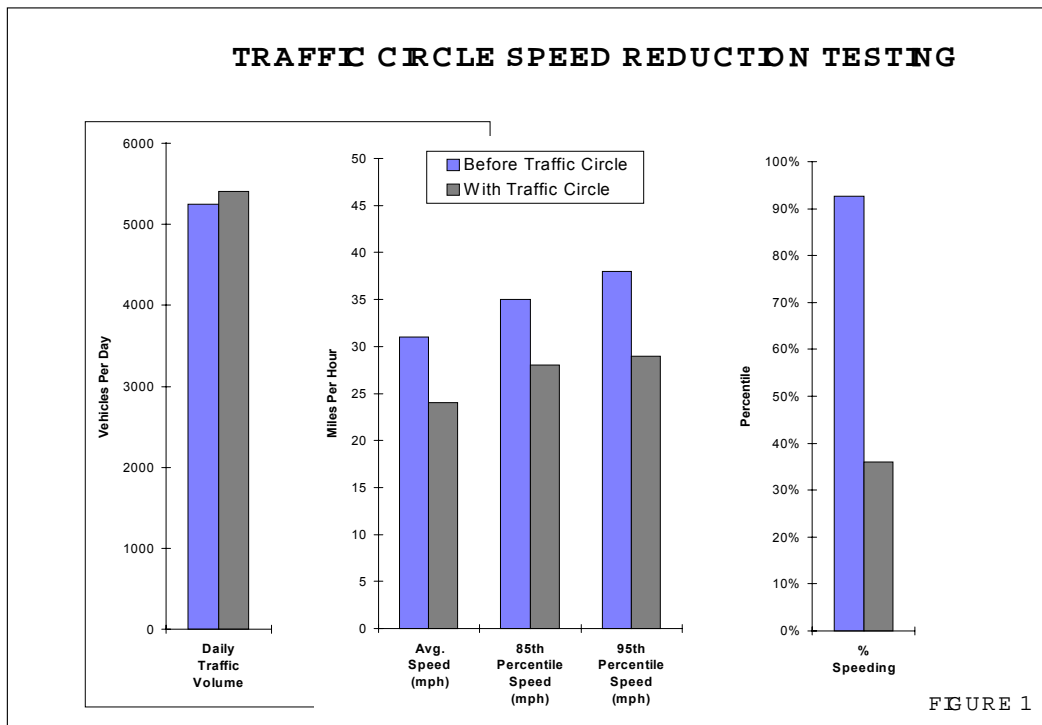
Recent testing in Boulder of experimental traffic circles on collector roadways with over 10,000 vehicles per day indicates that average speeds are reduced by up to 8 mph when measured halfway between two circles. In one case, the percentage of motorists exceeding the posted speed limit was reduced from over 90 percent to less than 40 percent, as illustrated on Figure 1.

All-way stop signs have been less effective at reducing travel speeds. Recent tests of speeds in Boulder one-half block from all-way stop control indicated that average speed changes ranged from a 1 mph decrease to a 4 mph increase as compared to the "before" condition.

San Leandro, California conducted tests on speed humps and traffic circles. The speed hump tests found an average 9 mph reduction in speeds, practically eliminating all speeds above 35 mph. They also found that the speed humps did not divert traffic to the parallel streets.

San Leandro's tests of traffic circles showed a reduction of speeds from 34 mph to 26 mph, and average 8 mph reduction. In all cases, the speed reduction is higher when measured close to the traffic calming device.

When considering the effectiveness of traffic calming measures, it is important to consider that neighborhood resident satisfaction is just as important as hard speed and volume data, but is much harder to measure. Local residents perceive the benefits of slower moving traffic through their neighborhoods in ways that are difficult to measure. Quality of life increases are often lost in a typical "after study." Additionally, motorists



traveling cross-town on a roadway that has been “calmed” will often express the perspective that their mobility on the public roadway has been impaired for the benefit of a few local residents. Surveys of resident and user satisfaction should be considered. Without documented information on citizen satisfaction, the measure of effectiveness may be reduced to which interest group screams loudest at public hearings or is most often published in the letters to the editor of the local newspaper.

**Implementation considerations**

When preparing a traffic calming plan, there are a number of considerations that may affect the successful implementation of the project. As noted above, a thorough public process with interested stakeholders is critical. Specific planning and design issues that should be carefully addressed include:

- Emergency response agencies must be involved in the plan development. If

emergency response agencies believe their mobility has been critically impaired without their input, it can become an emotional public debate, often in front of a city council or in the local press, where images of children being hit by cars are pitted against people dying in burning buildings or medical emergencies.

- Residents need to have a clear understanding of what the traffic calming measures will look like in their neighborhood before the contractor shows up. The use of photographic examples of similar installations and/or landscape architectural renderings of the proposed streetscape are vital to ensuring that residents are not surprised at the time of implementation. Similarly, residents need to have a clear understanding of the traffic control signs that will need to be added to support the selected devices. Signs are often viewed

as a visual intrusion in the neighborhood if their need is not understood.

- Test installations are less attractive, and in some cases less effective, than final installations. In a test case, green landscaping is often substituted by something that either is made of concrete or painted some shade of orange or yellow. Test installations are important in many cases, but extra communication efforts are needed ahead of time to help local residents and political leaders endure the “ugly stage” of the test.
- The implementation of vertical traffic calming measures (humps, raised crossings, raised intersections, etc.) needs to be carefully designed and carefully constructed to insure that the device meets the desired speed reduction goal. A constructed device that is too aggressive or too mild will not achieve the goals of the project and will discredit the entire traffic calming program.
- The implementation of horizontal traffic calming measures (medians, traffic circles, curb extensions and neckdowns, etc.) also needs to be carefully designed and constructed. Drainage issues need to be addressed before the pond develops, and truck and service vehicle traffic needs to be carefully accounted for so that service can be provided and trucks are not rerouted to other neighborhood streets.
- The combination and spacing of traffic calming measures is critical to their successful implementation. Each neighborhood is unique and the local considerations must be addressed when preparing the plan.

- Landscaping of the traffic calming measures often becomes an amenity to the local streetscape, but it needs to be carefully planned and implemented so that it does not become a safety hazard. Particular attention should be paid to the sight distance needs of pedestrians and motorists using the local transportation system. Low shrubs and deciduous trees with limbs trimmed up above six feet can be used near intersections and pedestrian crossings without compromising safety of the traveling public.

It is important to keep in mind that the success of the traffic calming project often depends on the system of devices that it includes. Any one device would not likely be effective in solving a traffic calming need. However, a system that includes a number of devices and types of devices that are carefully spaced in the neighborhood has a high probability for success, both from the perspective of measured engineering data and improved quality of life for the residents.

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