

Metropolitan Government of Nashville and Davidson County
Department of Public Works
720 South Fifth Street
Nashville, TN 37206
phone 615-862-8760 fax 615-862-5568

Department of Public Works

Nashville Neighborhood Traffic Management Pilot Program

Traffic Calming: Safety - Security - Livability

May 1998

**GRESHAM, SMITH AND PARTNERS
IN ASSOCIATION WITH RPM ASSOCIATES**

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DEPARTMENT OF PUBLIC WORKS

METROPOLITAN GOVERNMENT OF NASHVILLE
AND DAVIDSON COUNTY

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INTRODUCTION

As population and vehicular traffic continue to grow in Nashville, major roadways and intersections become more congested. As this occurs, frustrated motorists often resort to the use of local residential streets to bypass congested roadways or overloaded intersections. Motorists cutting through residential neighborhoods often ignore residential speed limits, particularly when the street design accommodates higher speeds. Some local residents also drive through their own neighborhoods in an inattentive or careless manner. The result is an ever increasing number of residents expressing concerns about the "safety" and "livability" of their neighborhoods.

Residents who live on these local streets perceive a primary danger to children playing adjacent to these streets, while others fear increased auto exhaust pollution, road noise, or hazards to walkers, joggers and bicyclists. Such concerns have led neighborhoods to organize in an effort to convince METRO Public Works (MPW) to take action to mitigate these situations. These neighborhood groups frequently request the Traffic Engineering Division of the Public Works Department to address their neighborhood traffic problems.

The Nashville Neighborhood Traffic Management Pilot Program (NTMP) was developed by MPW. Engineering staff of the Public Works Department was provided with many traffic calming resources acquired through an intensive research effort of traffic calming techniques and procedures that are in practice in the United States and around the world. Additional insights were gained on the management of traffic calming programs through a survey of communities who have well established traffic calming programs, or who have just recently completed the development of a traffic calming program (see Appendix C).

The MPW staff created the NTMP to provide a process for identifying and addressing problems related to speeding motorists, excessive traffic

volumes, and overall concern for safety on local residential streets. Under the program, the MPW staff works with residents within neighborhoods to identify the types and severity of traffic problems. Residents participate in developing and evaluating the various requirements, benefits, and trade-offs of NTMP projects within their own neighborhood and become actively involved in the decision-making process.

A NTMP project involves strategic physical or operational changes to streets in order to reduce vehicle speeds and to mitigate the negative impacts of automobile traffic in neighborhoods. Traffic calming techniques, such as those included in this program, are designed and located to encourage traffic to use major roads whenever possible. They do so by making the travel time on the residential streets greater than the travel time on the adjacent major roadways. Therefore, the residential streets are less convenient than the major roadways. Traffic calming also seeks to modify the behavior of the remaining drivers to that which is most appropriate for residential streets. Applying these techniques also impacts essential services to neighborhoods such as emergency response (fire, ambulance and police) and school bus routes.

To be effective, traffic calming techniques need to be part of an overall strategy which extends along a street section and potentially within an entire neighborhood. The aim is to control traffic over an area, not at an isolated site, and for the techniques to be compatible with street activities and adjacent land uses. Many traffic calming strategies have common aims to improve safety for people, especially children, to provide a greater sense of security, and to increase the neighborhood livability.

Safety: The most compelling reason for Australia and European countries to begin traffic calming in the 1970's was the poor safety conditions on local streets. People, particularly children, were being injured and sometimes killed on supposedly "safe" residential streets while walking the dog, going to the store, crossing the road, or bicycling. Studies have shown traffic calming can reduce accidents and accident potential on residential streets by up to one-third.

Security: Reducing vehicle speeds or separating pedestrians and other street users from vehicles reduces or eliminates the vehicle threat. This makes people feel more secure about using a street, or letting their children use or be near the street with little or no supervision.

Livability: Traffic calming enables residents to reclaim their street to use it for simple pleasures like walking, bicycling, travel to shops, parks, schools, etc. It allows them to have improved social interaction among neighbors, comfortably wash their car, let their children play in yards and along sidewalks, all in a more calm and quiet environment.

It is the intention of the NTMP to address traffic problems and concerns on local residential streets. While not intended to make streets play areas for children or adults, NTMP will generally improve safety for pedestrians, bicyclists and others who must travel along or across these streets. Major routes, collector streets and multilane roadways are not eligible for traffic calming under this pilot program. Also, there are other streets, depending on their location and individual characteristics, that may not be eligible for NTMP. This document provides procedures, guidelines and techniques to assist staff and residents in carrying out a NTMP project on their local residential street and in their neighborhood. The MPW is responsible for implementation of this program and any related revisions or appeals of its content.

GOAL, OBJECTIVES AND POLICIES

Goal

It is the goal of the Nashville Neighborhood Traffic Management Program (NTMP) to establish procedures and techniques that will promote neighborhood livability by mitigating the negative impacts of automobile traffic in residential neighborhoods. Although livability has no precise definition, it can be thought of as encompassing the following characteristics:

- The ability of residents to feel safe and secure in their neighborhood.
- The opportunity to interact socially with neighbors without significant traffic related distractions or threats.
- The ability to experience a sense of home and privacy.
- A sense of community and neighborhood identity.
- A balanced relationship between the multiple uses and needs of a neighborhood.

Objectives

The objectives of the NTMP are:

- To promote safe and pleasant conditions for residents, pedestrians, bicyclists, and motorists on neighborhood streets.
- To minimize the total amount of vehicular traffic on local neighborhood streets.
- To reduce the average speed of traffic on local neighborhood streets.

- To preserve and enhance pedestrian and bicycle access to neighborhood destinations.
- To encourage citizen involvement in neighborhood traffic management activities.
- To provide a process that will address neighborhood traffic management requests.

Policies

The policies governing the intent and application of this program are:

1. This program is intended to be applied to existing local streets serving predominantly single family residential neighborhoods. Through traffic (defined as traffic having no immediate origin or destination in the neighborhood being evaluated) should be routed to the maximum extent possible to the major roadways designated on the most recent versions of the Major Street Plan, Collector Street Plan, and SubArea Plans prepared by the Metropolitan Planning Commission.
2. The amount of rerouted traffic that is acceptable, as a result of a traffic management project, should be defined on a project-by-project basis. It is not the intent of this program to simply relocate traffic or traffic concerns to other local residential streets, although it may be desirable to better balance traffic across a network of residential streets.
3. Emergency vehicle access within and through neighborhoods will be carefully considered in the evaluation of traffic management requests and must be preserved in some reasonable fashion. It is recognized that certain traffic management techniques may result in increased emergency response times to certain streets and

neighborhoods, and these impacts must be understood and considered by the neighborhood in developing their traffic management program.

4. MPW shall employ a variety of traffic calming strategies and techniques to achieve the NTMP's objectives. Such traffic calming strategies and techniques shall be planned and designed in conformance with sound engineering and planning practices. All final plans and programs shall be reviewed and approved by MPW before implementation.
5. To implement the NTMP, certain procedures shall be followed by MPW in processing neighborhood traffic management requests in accordance with applicable Metropolitan Government codes and related policies and within the limits of available resources. At a minimum, the procedures shall provide for:
 - submittal of concerns and project proposals;
 - evaluation by staff of conditions and proposals;
 - citizen participation in and endorsement of plan development and evaluation;
 - methods of temporarily testing traffic management plans when needed; and
 - communication of any test results and specific findings to area residents and affected neighborhoods before installation of temporary or permanent traffic calming devices.
6. It is expected that all NTMP design and installation costs will be the responsibility of MPW with the exception of any needed right-of-way and/or easement and any ongoing landscaping maintenance requirements, both of which are the responsibility of the neighborhood. The installation of techniques that include landscaping features will require that a defined neighborhood group or association execute an agreement with the Metropolitan Government to provide ongoing landscape maintenance services as

long as such landscaping may exist. In addition, costs for removal or modification of any NTMP installations solely at the neighborhood's request will typically be deemed the responsibility of the neighborhood.

NTMP PROCESS AND PROCEDURES

The following process and procedures are considered typical for receiving, responding to, and managing residents' requests for neighborhood traffic management on their street or in their neighborhood. MPW will attempt to apply this process to all requests received. Variations in this process may be approved by MPW when deemed appropriate due to unique circumstances. Appendix A contains a typical schedule for implementing a NTMP project.

STEP 1: Identification of Neighborhood Problem

A neighborhood representative or association contacts MPW staff to discuss neighborhood traffic problems or concerns. MPW staff provides a copy of the NTMP document and reviews its key elements including the required application, neighborhood involvement requirements, petition process, and installation/evaluation process. A neighborhood representative completes and submits to MPW the NTMP Application (found in Appendix A) that generally outlines issues and concerns, and requests a neighborhood workshop meeting.

STEP 2: Preliminary Analysis of Neighborhood Problem

MPW performs any necessary data collection and analysis to assess and quantify the traffic and safety conditions in the neighborhood. MPW staff identifies the tentative study area, collects preliminary information from their files and other potentially-affected agencies, and completes any needed traffic analysis. While there are no absolute minimum criteria or

warrants established for use of NTMP techniques, staff will refer to the following guidelines when evaluating the magnitude of traffic and safety problems, potential for improvement using NTMP, and establishing priorities for project implementation:

A. Minimum Vehicular Volume

Daily Traffic Volumes greater than 1,000 vehicles, or Peak Hour Volumes greater than 100 vehicles are typically required to consider NTMP efforts on a particular residential street.

B. Cut Through Traffic

Cut through traffic is typically quantified by estimating actual traffic generation from within the affected area. License plate surveys may be conducted to determine more accurately the amount and nature of vehicles "cutting through" from outside the neighborhood or street. Cut through traffic should generally represent 25% or more of the total daily street volume to justify NTMP efforts for this reason alone.

C. Speed

Speeding problems typically exist when more than 15% of the traffic stream is traveling at least 10 mph over the posted or statutory speed limit.

D. Accidents - Pedestrians, Bicycles, Autos

Accident problems are considered significant when there are 3 or more reported accidents along a residential street or within a neighborhood during a period of twelve consecutive months.

E. Intersection Volumes

Residential street intersection problems may potentially exist when the total crossing volumes are greater than 3,000 vehicles on an average day.

F. Street Grades and Alignment

NTMP devices are not typically installed on streets with grades exceeding 8%, or where a combination of vertical and horizontal alignment

would result in inadequate stopping sight distance for motorists encountering NTMP devices.

G. Transit, School and Emergency Routes

Traffic calming devices are not typically installed on streets serving as a designated transit route or primary emergency access route. School bus routes should also be considered.

STEP 3: Neighborhood Traffic Team Meeting

MPW staff and representatives of other potentially affected Metro agencies first meet with the designated neighborhood representatives (referred to as the "Traffic Team", typically from two to five persons) to discuss traffic problems and concerns, potential solutions, and confirm the "affected area" to be ultimately petitioned on final NTMP plan recommendations. The "affected area" is generally defined as those properties along streets expected to receive NTMP devices, those streets whose access is substantially dependent upon the streets to be calmed, and any streets expected to receive significant increases in traffic volume or type as a result of the NTMP installation. MPW shall be responsible for final approval of the "affected area" to be petitioned.

STEP 4: Neighborhood Workshop Meeting

MPW staff, in conjunction with neighborhood representatives, schedules and holds an meeting (advertised by the neighborhood) for affected area residents to review the issues, results of the Traffic Team's and staff's preliminary analysis, and potential techniques for solutions. The purpose of the workshop is to overview the neighborhood concerns, present and discuss potential solutions through the NTMP, and develop consensus between MPW and workshop attendees for the strategies and devices that will be recommended to the affected area residents through the petition process. Representatives of other affected agencies such as Fire, Police and Schools

may be present at this meeting. In the event that the traffic management plan is revised in this step, MPW shall review, and revise if necessary, the "affected area" identified in Step 3.

STEP 5: Petition Process

Neighborhood representatives develop and submit to MPW a proposed petition attachment that clearly outlines the proposed NTMP. MPW reviews and approves the petition attachment for circulation with the standard petition form (found in Appendix A). If approved, neighborhood representatives next circulate the petition within the identified affected area. The petition must be delivered (in a legally acceptable manner) or offered to all residents (or property owners if vacant) in the affected area. To proceed further with NTMP project design and implementation, a positive response must be obtained by 67% or more of the total number of properties in the petition area. Only one petition vote shall be allowed per property with the exception of duplex dwellings wherein each dwelling unit shall be allowed one vote. Properties with more than two dwelling units will be allowed one vote, typically the property owner. All original petition responses, including those signatures in opposition to the proposal, shall be provided to MPW.

If the petition does not achieve the required level of support from the neighborhood, representatives may return to Step 3 to evaluate potential revisions to the NTMP plan and a second petition process.

STEP 6: Project Design and Implementation

When a NTMP project has received the necessary petition support, MPW staff schedules design and implementation of the project within budgetary constraints. Depending upon the number of NTMP requests received and the available funding for design and construction, a project may be placed on a waiting list and prioritized based on relative need.

Ongoing landscaping maintenance and any necessary right-of-way or easement dedication will be at the cost of the neighborhood. Any necessary property dedication or landscape maintenance agreement shall be completed prior to final project design.

Certain techniques may be installed for a "test period" while others may be installed in a permanent fashion. All installations will be monitored and evaluated by MPW staff for desired effectiveness. A monitoring period along with measurable objectives and performance measures will be established for each program installation.

STEP 7: Monitoring and Evaluation

Within sixty to ninety days after installation of the project, MPW staff will begin evaluation of the project, including resident and motorist reaction, field observations, traffic counts, speed studies and other data collection as needed. If the project has not met its objectives within the monitoring period, staff will notify the neighborhood representatives. The staff and the neighborhood representatives may then consider alternative solutions (Return to Step 3).

STEP 8: Removal of a NTMP Project

If MPW decides that the project should be modified or removed for public health and safety reasons, they shall proceed to remove or modify the installation upon notification to the neighborhood representatives. If MPW has no concerns with the NTMP project but the neighborhood itself decides that the traffic calming devices should be removed or significantly altered, the neighborhood must furnish petitions and signatures (see Step 5) of more than 67% of households and businesses in support of the removal or alteration. The neighborhood may also be required to fund the removal or alteration of the project.

NTMP TECHNIQUES AND STRATEGIES

MPW, with the assistance of a Traffic and Pedestrian Safety Task Force, examined many different traffic calming techniques in use today. Realizing that Nashville neighborhoods are not all the same and there are a variety of street designs within neighborhoods, the NTMP program includes a wide range of techniques that may be necessary to address differing street and traffic conditions on local residential streets.

Traffic calming techniques generally fall under two categories - physical and psychological. In general, wider roads encourage higher automobile speeds. Consequently, many traffic calming techniques are designed to physically change the width or alignment of the street. Techniques such as neckdowns, roundabouts and medians all decrease road width.

If a motorist can see far into the distance, his or her speed increases. The interruption of sight lines with changes in the road direction using techniques such as slow-points and roundabouts, or breaking the road into smaller visual units by changing the surface pavement using techniques such as brick pavers or stamped concrete, causes most drivers to slow down. It also means motorists widen their vision field becoming much more aware of pedestrians and bicyclists. Proper changes in the road design encourage traffic to travel at a slower, more even pace.

Traffic calming may also be achieved by changing the psychological feel of the street. Streets using different surface types, vertical landscaping or narrowed lanes create the appropriate space for a relaxed, pedestrian-friendly feel. These psychological changes give motorist cues that they are no longer on a major roadway but are in a different environment that is shared with people.

All traffic calming techniques have a limited range of effectiveness. To achieve traffic calming objectives, some techniques need to be placed every few hundred feet. If traffic calming techniques are used too sparsely,

traffic may slow close to the installation, but the overall speed along the street will probably not decrease. One technique may be used multiple times or multiple techniques may be used in conjunction with one another. Most techniques will affect emergency service response, traffic noise, air quality, congestion, fuel consumption and many other factors. Some can improve these conditions; others may cause these problems to increase.

Emergency vehicle access and response time must be carefully considered when designing and installing traffic calming devices. Emergency vehicles, particularly ambulances, have more difficulty with "vertical" devices such as speed humps than with "horizontal" devices such as neckdowns. Longer fire vehicles and equipment such as ladder trucks may have trouble negotiating "horizontal" devices. Studies have shown that traffic calming devices may slow response times up to ten (10) seconds per device. This impact must be understood and considered by neighborhood residents in development of their traffic management program.

Likewise, bicyclists, pedestrians and other expected street users must be kept in mind when developing a traffic calming strategy, as some devices can obstruct their movements. Many devices can be modified to allow bicyclists and pedestrians to by-pass them. For instance, a diverter can be fitted with a bicycle/pedestrian path to allow for those users' particular access needs.

A summary of available options for neighborhood traffic management techniques is provided in Table 1. The options have been structured into four levels. Level 1 is the least restrictive and typically has the lowest cost, while Level 4 is the most restrictive and costly and may require approvals beyond the process outlined in the NTMP. These options have been chosen for their impact on vehicle speeds and volumes on residential streets. Appendix B contains additional details for each option, including a sketch of the technique as well as its advantages and disadvantages.

Traffic calming techniques work best when incorporated into a neighborhood traffic management program. Successful programs include the planning process, overall community participation and local authority support. Because

residents are the main initiators of traffic calming requests, it is critical that they be a part of the process as much as possible. Developing a program early on that addresses neighborhood traffic safety and livability concerns on an area wide basis encourages citizens to become actively involved in the improvement process. In this way, Metro Public Works and residents can work together to create safer and more livable neighborhoods throughout Nashville.

TABLE 1: NEIGHBORHOOD TRAFFIC MANAGEMENT AND CALMING OPTIONS

LEVEL	TRAFFIC MANAGEMENT OPTION (Page No.)	SAFETY IMPROVEMENT	SPEED REDUCTION	TRAFFIC REDUCTION	FUEL CONSUMPTION	POLLUTION	EMERGENCY SERVICES	INSTALLATION COSTS
1	Neighborhood Education (1B)	Possible	Possible	No	No Effect	No Effect	No Effect	\$1,000-\$5,000 each
1	Traditional Enforcement (2B)	Yes (when present)	Yes (when present)	No	No Effect	No Effect	No Effect	\$90,000 per year for officer and equip.
1	Neighborhood Monitoring Program (3B)	Possible	Possible	No	No Effect	No Effect	No Effect	\$5,000-\$10,000
1	Radar Speed Monitoring Trailer (4B)	Possible (when present)	Yes (when present)	No	No Effect	No Effect	No Effect	\$10,000-\$15,000
1	Traffic Calming Sign (5B)	Possible	No	Not Alone	No Effect	No Effect	No Effect	\$50-\$75 per sign
1	Road Striping (6B)	Possible	Possible	No	No Effect	No Effect	No Effect	\$1,000-\$5,000
1	Higher Visibility Crosswalks (7B)	Yes	Possible	No	No Effect	No Effect	No Effect	\$1,000-\$5,000 each
1	Rumble Strips (8B)	Possible	Possible	No	No Effect	No Effect	Possible Problems	\$1,000-\$5,000
2	Commercial Vehicle Restrictions (9B)	Yes	No	Yes	No Effect	No Effect	No Effect	\$50-\$75 per sign
2	Textured Pavement (10B)	Possible	Possible	No	No Effect	No Effect	Possible Problems	\$5,000-\$10,000 per location
2	Mid-Block Median (11B)	Possible	No	Possible	No Effect	No Effect	Possible Problems	\$50,000-\$100,000

TABLE 1 (cont'd): NEIGHBORHOOD TRAFFIC MANAGEMENT AND CALMING OPTIONS

LEVEL	TRAFFIC MANAGEMENT OPTION (Page No.)	SAFETY IMPROVEMENT	SPEED REDUCTION	TRAFFIC REDUCTION	FUEL CONSUMPTION	POLLUTION	EMERGENCY SERVICES	INSTALLATION COSTS
2	Speed Humps (12B)	Yes	Yes	Possible	Small Increase	Small Increase	Possible Problems	\$3,000-\$5,000 each
2	Raised Crosswalks (13B)	Yes	Yes	Possible	Small Increase	Small Increase	Possible Problems	\$3,000-\$5,000 each
2	Intersection Hump (14B)	Yes	Yes	Possible	Small Increase	Small Increase	Possible Problems	\$50,000-\$100,000 each
2	Gateway Treatment (15B)	Possible	Possible	Possible	No Effect	No Effect	Possible Problems	\$10,000-\$20,000
2	Curb Radius Reduction (16B)	Possible	Possible	No	No Effect	No Effect	Possible Problems	\$5,000-\$10,000
3	Traffic Circles (17B)	Yes	Yes	Possible	Small Increase	Small Increase	Possible Problems	\$5,000-\$10,000
3	Roundabouts (18B)	Yes	Yes	Possible	Small Increase	Small Increase	Possible Problems	\$10,000-\$30,000
3	Deviations/ Chicanes (19B)	Yes	Yes	Possible	Small Increase	Small Increase	Possible Problems	\$50,000-\$100,000
3	Angled Slow Points (20B)	Yes	Yes	Possible	Small Increase	Small Increase	Possible Problems	\$10,000-\$30,000
3	Lane Narrowing (21B)	Possible	Yes	Possible	Small Increase	Small Increase	Possible Problems	\$10,000-\$30,000

TABLE 1 (cont'd): NEIGHBORHOOD TRAFFIC MANAGEMENT AND CALMING OPTIONS

LEVEL	TRAFFIC MANAGEMENT OPTION (Page No.)	SAFETY IMPROVEMENT	SPEED REDUCTION	TRAFFIC REDUCTION	FUEL CONSUMPTION	POLLUTION	EMERGENCY SERVICES	INSTALLATION COSTS
3	Neckdowns (22B)	Possible	Yes	Possible	Small Increase	Small Increase	Possible Problems	\$10,000-\$20,000
3	Modified Intersection (23B)	Yes	Yes	Possible	Small Increase	Small Increase	Possible Problems	\$10,000-\$30,000
3	Forced Turn Barriers/Diverter (24B)	Possible	Possible	Yes	Small Increase	Small Increase	Possible Problems	\$5,000-\$15,000
4	Partial Street Closure (25B)	Yes	Possible	Yes	Small Increase	Small Increase	Possible Problems	\$5,000-\$15,000
4	Traversable Barriers (26B)	Yes	Yes	Yes	Small Increase	Small Increase	Possible Problems	\$10,000-\$20,000
4	Diagonal Road Closures (27B)	Yes	Yes	Yes	Small Increase	Small Increase	Possible Problems	\$10,000-\$20,000
4	One-way Streets (28B)	Yes	No	Possible	Small Increase	Small Increase	Possible Problems	\$5,000-\$10,000
4	Cul-De-Sac (29B)	Possible	Yes	Yes	Small Increase	Small Increase	Possible Problems	\$30,000-\$60,000
4	Street Closures (30B)	Possible	Yes	Yes	Small Increase	Small Increase	Possible Problems	\$30,000-\$60,000